AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Currently Amended) A controller system for use in a subterranean well comprising:
a controller located in the well; and
a signal source capable of putting a command signal into the well;
wherein the controller is responsive to a repeating command signal that is a repeat of a first command signal, the first and repeating command ~~signal~~ signals previously unknown to the controller, the controller responsive to the repeating command signal by actuating a tool, wherein the controller is configured to distinguish the first command signal from noise based on characteristics of the first command signal.

2. (Original) The controller system of claim 1 in which the controller further comprises:
a memory unit;
a microprocessor;
a buffer;
an analog-to-digital converter; and
a downhole tool interface.

3. (Original) The controller system of claim 1 in which the signal source provides a pressure sequence.

4. (Original) The controller system of claim 1 in which the signal source provides an acceleration.

5. (Original) The controller system of claim 1 in which the signal source provides variable flow rates of fluid.

6. (Original) The controller system of claim 1 in which the signal source provides variations in applied force.

7. (Original) The controller system of claim 1 in which the signal source provides variations in stress or strain.

8. (Original) The controller system of claim 1 in which the controller uses at least one computed parameter to distinguish the command signal.

9. (Original) The controller system of claim 8 in which the controller further comprises a buffer to store data used to create a first profile and a second profile, and in which the at least one computed parameter includes the correlation coefficient between the first profile and the second profile.

10. (Currently Amended) A controller for use in a subterranean well comprising:
a memory unit;
a microprocessor;
a buffer;
an analog-to-digital converter; and
a downhole tool interface;
in which the microprocessor executes a program stored in the memory unit to determine whether to initiate the downhole tool interface based on the recognition of a previously unknown command signal, the microprocessor recognizing the command signal in response to detecting that the command signal has been repeated,
and the microprocessor detecting that the command signal has been repeated by calculating a correlation coefficient and comparing the correlation coefficient to a reference value, the correlation coefficient calculated based on comparing a first portion of the command signal with a second portion of the command signal.

11. (Original) The controller of claim 10 in which the command signal is sampled by the analog-to-digital converter and the samples are stored in the buffer.

12. (Previously Presented) The controller of claim 11 in which a portion of the samples stored in the buffer represent a first command signal and a portion of the samples in the buffer represent a repetition of the first command signal.

13. (Previously Presented) The controller of claim 12 in which the recognition is based on a comparison of the samples representing the first command signal to the samples representing the repetition of the first command signal.

14. – 15. (Cancelled)

16. (Currently Amended) A method to determine whether a previously unknown command signal has been issued into a well comprising:
taking data samples at a desired location in the well;
storing the data samples in a buffer;
computing parameters using the data samples in the buffer, wherein the computed parameters comprise a first parameter for data samples in a first portion of the buffer, and a second parameter for data samples in a second, different portion of the buffer;
comparing the ~~computed~~ first and second parameters ~~to pre-defined tolerances~~; and
deciding whether the data samples in the buffer correspond to a command signal ~~was issued~~ based on the ~~comparison results~~ comparing.

17. (Currently Amended) The method of claim 16 in which [[the]] computing the first and second parameters includes computing at least one of a first mean and second mean, and computing a first standard deviation and second standard deviation~~, and a correlation coefficient~~.

18. (Previously Presented) A method to control a downhole tool in a subterranean well comprising:
placing a controller in a desired location in the well;
sending a repeating signal from a signal source to the controller;
recording samples while the signal is being sent in a buffer in the controller to create upper and lower profiles in the buffer;
comparing the upper profile to the lower profile to determine whether the profiles constitute a match, wherein the match indicates the repeating signal is a command signal, wherein the command signal was previously undefined at the controller; and
initiating actuation of the downhole tool if the match is found.

19. (Original) The method of claim 18 in which the comparing includes computing a correlation coefficient.

20. (Original) The method of claim 18 in which the comparing includes comparing the mean and standard deviation of the upper profile to the mean and standard deviation of the lower profile.

21. (Cancelled)

22. (Currently Amended) The controller system of claim [[21]] 1, wherein the controller autocorrelates a first waveform representing the first ~~occurrence of the~~ command signal with a second waveform representing the ~~repetition of the~~ repeating command signal.

23. (Currently Amended) The controller system of claim 1, wherein each of the first and repeating command signal ~~previously unknown to the controller~~ is a pressure profile, and wherein the controller recognizes the pressure profile by detecting a first occurrence of the pressure profile and a repetition of the pressure profile.

24. (Previously Presented) The controller of claim 10, wherein the microprocessor recognizes the command signal in response to detecting a first occurrence of the command signal and repetition of the command signal.

25. (Previously Presented) The controller of claim 10, wherein the command signal previously unknown to the microprocessor is a pressure profile, and wherein the microprocessor recognizes the pressure profile by detecting a first occurrence of the pressure profile and a repetition of the pressure profile.

26. (Previously Presented) The method of claim 16, wherein taking the data samples comprises:
taking a first sample representing a first occurrence of the command signal; and
taking a second sample representing a second occurrence of the command signal.

27. (Previously Presented) The method of claim 16, wherein the taking, storing, computing, comparing, and deciding acts are performed by a controller, and wherein the command signal was previously unknown to the controller.

28. (New) The controller system of claim 1, wherein the controller distinguishes the first command signal from noise by comparing a characteristic of a first portion of the first command signal to a characteristic of a second, different portion of the first command signal.

29. (New) The controller system of claim 28, wherein the compared characteristics comprise a mean of the first portion and a mean of the second portion.

30. (New) The controller system of claim 28, wherein the compared characteristics comprise a standard deviation of the first portion and a standard deviation of the second portion.